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Versuche über die Ablenkung der Aufmerksamkeit. ARVED BARTELS.
Inaug. Dis. Dorpat, 1889.

The writer of this thesis, like Oehrn, a pupil of Kræpelin's, has studied the distraction of the attention in the field of light sensations by finding the variation in the threshold stimulus for one eye, when its reception was preceded at a short interval by another stimulus in the other eye. For the description of the rather complex apparatus and the detail of the experimentation the reader must be referred to the original; the following points, however, may be mentioned: the threshold was fixed at the point where half the judgments were correct (method of right and wrong cases); the distracting stimulus was 1515 times as intense as that of the threshold, and lasted 0.171 sec. against 0.448 sec. for the latter; the intervals between the two were varied from 0.1 to 10 seconds, those from 1 to 6 receiving most attention. Evidence of distraction was found, lasting as long as 6 seconds, but evidence also of a diametrically opposite effect, the intended distraction acting like the warning signal in reaction-time experiments and helping to concentrate the attention. The intervals at which this was most marked were about $2\frac{1}{2}$ sec. and $4\frac{1}{2}$ sec. with some signs of another such period at a little more than 7 seconds. This rhythmic change recalls those found by time-sense experimenters, but is much longer (Estel 0.75 sec.; Mehner 1.4 sec.; Glass 1.25 sec.). It agrees, however, pretty well with the interval in estimating which the smallest error is made, and with this it is probably connected; L. Lange, Ewald and Wundt have found the two-second warning to be the most effective one in reaction-time experiments. The experiments tried show that there is no connection with the two-second periodicity of the unconstrained attention (N. Lange). When the interval between the stimuli varied each time and the subject only knew the limits within which it might vary, he seemed to adjust his attention to a point midway between.

Ueber die psychologischen Grundlagen der Vergleichung gehobener Gewichte. G. E. MÜLLER und FR. SCHUMANN. Reprint from Pflüger's Archiv., Bd. XLV, pp. 37-112, 1889.

This very important paper is an investigation of the simple illusion which makes a light weight lifted after a heavy one seem disproportionately light, and *vice versa*. The importance for psychophysics experimentation of such a study is obvious, but the writers value their work less as a contribution to that subject than to the theory of motor adjustment and organic memory. The weights were lifted behind the back with every precaution to secure accurate results. A typical experiment is as follows: A standard weight of 676 grammes was compared five times each with weights of 626, 676, 726, 776, 826, 876 grammes. The last was recognized as heavier every time, the next-to-the-last four times. The standard weight was then compared 30 times with a weight of 2476 grammes, and after that once each with weights of 926, 876 and 826 grammes. All seemed lighter. After five more comparisons with the 2476 gramme weight, it was again compared with the last three, and so the experiment continued. In this case the standard and comparison weights were lifted with different hands, but the illusion occurs in single handed experiments also, and it is even possible in a certain degree to disturb the judg-

ments of weights lifted with one hand by lifting heavy weights with the other.

This illusion is due, not to "contrast," but to an unconscious adaptation (*Einstellung*) of the motor centers to the more vigorous impulses required by the heavier weights. In the normal comparison of weights the nervous discharge for the lifting of each, though wholly unknown in amount to the subject, is the same. *The judgment is made from the speed with which the weight comes up.* When by the change of weights a discharge adapted to a heavy one meets a light one, the latter rises with an unaccustomed velocity and is therefore pronounced lighter. Such motor adaptations may be of different kinds, and, corresponding to them, there is an adaptation of the sensory attention. Such adaptations play a part in ataxic phenomena: (*e. g.* a patient unable to move a given finger at request except with open eyes, once having developed a motor adjustment by moving it so, can thereby keep on moving it for a little while after his eyes are closed), in the pleasure of rhythmic movements, the periodicity of the time sense, etc. The authors reject the inner-ervation sense *in toto*, (in a later chapter they subject it to a thorough-going critique), likewise the muscle-sense, at least as a factor in judging weights. If such senses are the discriminating ones, they should tell us of the amount of force expended and prevent the illusion. The theory that weights are judged by the velocity with which they are lifted was suggested by Hering in a letter to Fechner, and was adumbrated by Lewinski and others, but has now for the first time been given a full experimental treatment. If weights are judged by velocity, the question of the perception of the movements and positions of the limbs becomes a cardinal one. On this point the authors accept the views of Goldscheider, locating the sensations chiefly in the joints, but reject his notion of an independent motion-sense.

Other sources of error were investigated, *e. g.* the *Zeitfehler*, or error introduced by the order of lifting the weights and the time interval between the lifting of the standard and of the weight to be compared, and the *Raumfehler*, or error introduced by the different distance and direction of the weights from the body of the lifter. Both of these find interesting and plausible explanation in the adaptation theory stated above. Special fatigue experiments showed, contrary to Fechner's "parallel law," a decline in the discriminative sensibility. A third weight lifted between the two to be compared, at first caused large errors, but the subject soon became able to neglect it. Weber's law follows as a necessary consequence of this theory, provided that light and heavy weights are judged by their velocities, for the just observable difference is then a difference of velocities, and it is a principle of mechanics that the change in mass needed to produce a fixed (just observable) change in the rate of a moving mass must vary proportionally to that mass. Practically however the law is much overlaid by confusing circumstances.

Voluntary Control of the Heart. EDW. A. PEASE. Reprint from the Boston Med. and Surg. Journal, May 30, 1889.

Mr. Pease reports a set of experiments upon a student in the Harvard Medical School who possesses this rare power. The subject was able with little irregularity of respiration to increase his pulse-rate for a few seconds in the proportion of about 17 beats per